Resource Allocation Does Matter in Improving Student Performance

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Abstract

The relationship between resource allocation and student performance was examined through a comparison of the resource allocation patterns of low- and high-performing school districts in four states in the Southwest and through a description of the resource allocation patterns, practices, and barriers of 12 districts with consistent gains in student performance ("improvement districts"). Results from analysis of fiscal and staffing data showed that high-performing districts spent more money and employed more staff in certain instructional categories when compared to low-performing districts. The resource allocation patterns of the 12 improvement districts showed that they had a focus on instruction, and also re-allocated resources toward instructional areas over time, more than districts of similar size. Results from analysis of teacher surveys and administrator interviews from the 12 improvement districts evidenced the effective practices implemented by the districts as well as the challenges and barriers faced by the districts. Recommendations for policymakers and directions for future research are discussed.

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Introduction

School finance research has examined the inputs and outcomes of the educational process for a long time; however, as expectations rise for students and teachers to perform at higher levels and for schools to guarantee the success of all students, the question of how to achieve these goals through the best use of resources becomes even more critical.

Using the method of production functions, Coleman et. al (1966) found only a weak association between school resources and student performance (but concluded that family background characteristics had a large and statistically significant effect on student performance). Hanushek's (1986, 1997) reviews of hundreds of studies found no systematic, positive relationship between school resources and student performance. However, Hedges and his colleagues (1994, 1996) concluded that the relationship between resource inputs and student outcomes was consistent and positive and could be used to frame educational policy. They reported that "a broad range of school inputs are (sic) positively related to student outcomes, and that the magnitude of the effects are (sic) sufficiently large to suggest that moderate increases in spending may be associated with significant increases in achievement" (p. 362).

A second group of studies have described what schools do to reallocate resources in response to higher standards. For example, Odden and Archibald (2001) found that strategies included reallocating resources from pull-out programs to regular classes, increasing planning time with innovative scheduling, expanding roles for teachers, and reducing the number of pupil support specialists (counselors, social workers, etc.) A third group of studies have evaluated the impact of certain strategies (some of which are resource-intensive) on student performance, such as smaller schools (Stiefel, Berne, Iatarola, & Fruchter, 2000), lower student-teacher ratios and

smaller class sizes (Grissmer et al., 1998; Picus, 2001; Ferguson, 1991; Krueger, 1998; Murnane & Levy, 1996), the use of aides (Krueger, 1998), directing money toward services for minority and disadvantaged students (Grissmer, Flanagan, and Williamson, 1998), increasing teacher quality (Grissmer et al., 1998; Krueger, 1998), reorganizing schools using new design ideas such the New American Schools design, and restructuring school time (Picus, 2001). Ballou (1998) concluded that none of three resource-intensive policies (regarding parent choice, use of substitutes, and teacher salaries) were particularly effective. A fourth group of studies have examined successful schools and districts in efforts to discover "best practices" that warrant the investment of resources (e.g., Miles and Darling-Hammond, 1998). A pilot study conducted by the Southwest Educational Development Laboratory (SEDL, 2000) found that high-performing school districts in Texas had resource allocation patterns that were different from low-performing districts, and that the strategies and attitudes of school districts regarding resource allocation were unique and, in many cases, innovative.

Looking ahead, it is apparent that student achievement will need to improve dramatically if all students are to have equal access to good jobs and secure futures. Rather than justifying requests for more money, the issue is how more achievement can be produced with resources roughly at current levels. The purpose of this study was to follow up on prior studies by examining the resource allocation patterns, practices, and barriers of successful districts, and identifying effective district practices. The research questions of the study were:

1. What are the resource allocation patterns over time across schools districts at varying levels of student performance?
2. How do school districts with consistent gains in student performance ("improvement districts") allocate their resources?
3. What resource allocation practices have improvement districts implemented that they identify as effective?
4. What barriers and challenges have improvement districts faced in their resource allocation practices?

Methods

Both quantitative and qualitative methods were used to answer the four research questions. For Research Question 1, regular independent school districts in all four study states comprised the research sample, totaling 307 districts in Arkansas, 66 in Louisiana, 89 in New Mexico, and 1,042 in Texas. District-level fiscal, staffing, and demographic data were obtained from the National Center for Education Statistics (NCES). Fiscal data on expenditures and revenues were collected from the *Annual Survey of Local Government Finances: School Systems* for school years 1994–1995 to 1998–1999 (see Figure 3.1) while staffing and demographic data were collected from the *Common Core of Data, Local Education Agency (School District) Universe Survey* and *Public Elementary/Secondary School Universe Survey* for school years 1995–1996 to 1999–2000. The staffing data included the number of teachers and administrative staff (district administrators, district administrative support, school administrators, and school administrative support) per 1,000 students. The demographic data included various district and student characteristics. District-level student performance data (standardized test scores) from 1997-1998 to 1999-2000 were collected from the state departments of education in all four states.

Within each state, districts were ranked by student performance and divided into three equal-sized groups of high-, mid-, and low-performing districts. Districts were also divided into adjusted performance groups using a regression model that controlled for percent free lunch, minority enrollment, special education enrollment, and district size (student membership). To examine the differences between the high- and low-performing groups in fiscal and human resource allocation, group means of the five years of data were compared using an analysis of variance (ANOVA) and Tukey post-hoc tests.

To answer Research Questions 2-4, a smaller sample of 12 school districts were selected on the basis of at least three consecutive years of performance gains from 1996–1997 to 1998–1999. The districts were also selected to have higher-than-state-average levels of minority and/or poverty student populations, and to reflect the diversity of districts in their states in terms of geographic location and size.

The NCES fiscal and staffing data used in the analysis of all districts were also used to describe the resource allocation patterns of the 12 improvement districts. Comparisons were made between each of the 12 improvement districts and a group of districts of similar size within each state. Each improvement district's comparison group consisted of the district itself and 12 other districts with a student population immediately above and below that of the improvement district. The staffing and fiscal patterns of each improvement district were compared to those of the districts in its comparison group using paired samples t-test. For the staffing and fiscal variables for which no statistical significance was found, researchers examined the data and counted how many of the 12 improvement districts showed higher expenditures or more staff in a particular category than their comparison groups.

Researchers also conducted individual interviews with four to seven district and school administrators in each district (superintendents, directors of instruction, chief financial officers, personnel directors, and principals). Focus groups were conducted in four of the improvement districts, and included groups of up to eight principals. Qualitative data from interviews and focus group sessions were reviewed, categorized, and analyzed using qualitative methods, as recommended by Miles and Huberman (1994). Three areas of thematic categories were identified: (1) innovative resource allocation practices, (2) general practices found effective or directly related to student achievement growth, and (3) barriers and challenges in allocation

practices. Finally, surveys were distributed to all teachers in the 12 improvement districts, and 1,701 surveys were returned (22% return rate).

Results

Research Question 1: Resource Allocation Patterns in High- and Low-Performing Districts

Results from the ANOVA comparing high-performing and low-performing districts showed a general pattern in which higher performance was associated with higher spending for instruction, core expenditures, and number of teachers and with lower spending for general administration and number of administrative staff (see Table 4.1). In all four states, high-performing districts spent significantly more than low-performing districts on instruction as a share of current expenditures. In three of the four states (Louisiana, New Mexico, and Texas), high-performing districts spent more per pupil on instruction and also employed more teachers per 1,000 students when compared to low-performing districts. (See table 4.1 for detailed results).

Table 4.1

Comparison of Fiscal and Staffing Allocations in Non-Adjusted Performance District Groups

	Instruction expenditures		Core expenditures		General administration		Teachers	Admin. staff
State	Per pupil	Share	Per pupil	Share	Per pupil	Share	Per 1,000 students	Per 1,000 students
AR N=307	-	+	-	+	-	-	-	-
LA N=66	+	+	+	+	-	-	+	ns
NM N=89	+	+	ns	ns	ns	ns	+	ns
TX N=1042	+	+	ns	-	+	+	+	-

Note. (+) indicates that high-performing districts spent more than low-performing districts ($p<.05$) while (-) indicates that high-performing districts spent less than low-performing districts ($p<.05$) and (ns) indicates no significant difference between the high-performing and low-performing group. Expenditure shares are shares of total current expenditures.

When the comparisons of low-performing and high-performing districts controlled for student and district characteristics, non-significant results predominated, with no significant differences at all between the groups in Arkansas and New Mexico. However, the results from Louisiana and Texas showed a general pattern where higher performance was associated with higher levels of fiscal and human resources. In both states, high-performing districts spent more per pupil on instruction and core expenditures, and also employed more teachers per 1,000 students. (See table 4.2 for detailed results).

Table 4.2

Comparison of Fiscal and Staffing Allocations in Adjusted Performance District Groups

	Instruction expenditures		Core expenditures		General administration		Teachers	Admin. staff
State	Per pupil	Share	Per pupil	Share	Per pupil	Share	Per 1,000 students	Per 1,000 students
AR N=307	ns	ns	ns	ns	ns	ns	ns	ns
LA N=66	+	+	+	ns	ns	ns	+	+
NM N=89	ns	ns	ns	ns	ns	ns	ns	ns
TX N=1042	+	ns	+	-	+	+	+	ns

Note. (+) indicates that high-performing districts spent more than low-performing districts ($p<.05$) while (-) indicates that high-performing districts spent less than low-performing districts ($p<.05$) and (ns) indicates no significant difference between the high-performing and low-performing group. Expenditure shares are shares of total current expenditures.

Research Question 2: Staffing and Fiscal Resource Allocation in the Improvement Districts

Results from the analyses comparing the improvement districts to their comparison groups showed that the improvement districts had a focus on instruction and instruction-related resource allocation, and that they re-allocated their resources toward instructional areas over time (from 1994-95 to 1998-99). Paired samples t-tests showed that the improvement districts increased the

number of teachers per 1,000 students over time (M = 7, SD = 3) more than the comparison districts (M = 5, SD = 2), t(11) = 3.422, p = .006 (two-tailed). The improvement districts also increased core expenditures per pupil over time (M = 556, SD = 227) more than the comparison district (M = 462, SD = 224), t(11) = 2.398, p = .035 (two-tailed). At the same time, the improvement districts increased per-pupil spending for non-instructional services *less* over time (M = 1, SD = 34) than the comparison districts (M = 27, SD = 29), t(11) = 3.355, p = .006 (two-tailed).

Visual inspection of the resource allocation patterns of the improvement districts showed that, compared to the comparison districts, at least eight of the 12 districts employed more teachers per 1,000 students and spent more per pupil on total current expenditures and total core expenditures (consisting of instruction, student support, and instructional staff support) as well on the three individual components of core expenditures. However, none of these comparisons between the improvement districts and comparison districts were statistically significant.

Research Question 3: Effective Practices in the Improvement Districts

Analysis of interview and survey responses found that the improvement districts aligned district goals and general reform efforts with creative and effective application and allocation of monetary, staff, time, physical, and parent/community resources in an effort to support student performance improvement.

Needs-based budgeting enabled the improvement districts to align available monetary resources to students' needs and state, district, and school instructional goals. In order to apply a needs-based strategy, the improvement districts demonstrated that funds must be flexible and available, student needs must be clearly identified through data analysis, and budget planners

must work from a commonly understood set of school improvement goals. Most of the improvement districts used categorical funds creatively and pooled these funds with grants and district general funds. Student performance data, demographic information, and student profiles were used to identify high need areas that increased resources could address. Additionally, a number of the improvement districts examined school requests for additional money to ensure they were aligned with established school and/or district improvement priorities.

Building instructional staff capacity was another practice demonstrated to make successful changes in student performance. District administrators implemented strategies to enhance staff capacity, i.e., knowledge, skills, willingness, and support to make change. The 12 improvement districts directed resources to increase the number of certified teachers, limit the use of paraprofessionals, and offer incentives to attract and retain teachers. Professional development was a focus for many fiscal and non-fiscal resources, with instructional staff receiving training and support in state standards, math and reading curriculum, technology, and leadership. Existing instructional staff were often reallocated based on their strengths into priority areas or newly created positions, such as subject area specialists, master teachers, or mentor teachers.

Material resources were used effectively to support student success by improving the school environment and developing a source of monetary and in-kind contributions for a range of services to students. Many districts greatly increased technology spending to install necessary infrastructure and computer equipment, train teachers and administrators, and more fully incorporate technology into the classroom. Staff acquired new federal funds, state incentive money, and private donations to pay for this technology without taking away from general operating funds. New and expanded building facilities, particularly new schools and classrooms,

were also a focus of spending. More than half of the districts were able to obtain outside funding for building projects through facilities grants and bond/millage money, some also used available fund balance dollars.

Parent and community involvement was identified by administrators as most important to the improvement process. Parents and the community supported schools and districts by raising funds, providing in-kind services, giving volunteer time, partnering with special programs or services for students, passing tax increases, and recognizing education successes openly in the community.

Collaborative leadership was used to support district resource allocation strategies to increase student performance. Nearly all improvement districts benefited from stable, effective leadership, with strong, long-term superintendents and/or instructional and organizational leadership of a core group of administrators and/or principals. Qualities of effective district leaders included a clear focus or vision for the district, an ability to foresee new challenges and adapt before they became crises, an understanding of the needs of the district, and open communication with and reliance on other key district and school administrators. Most of the 12 improvement districts relied on collaborative decision-making to plan and allocate resources, with partners including district and school administrators, teachers and other staff, parents, community members, and other school district representatives.

Formal and informal evaluations were incorporated into decision making processes. Evaluation methods used to decide on new educational programs and materials included informal surveys or recommendations from other schools or districts, published research results, and internal reviews using a panel of teachers and administrators. Some districts evaluated existing programs using formal evaluation of program impacts, informal observations or

recommendations from staff, and assessment of their alignment with goals and priorities. Eight of the 12 improvement districts implemented testing beyond what was required by the state to use as a tool for tracking student progress and identifying weak areas in instruction that helped teachers modify curriculum to meet student needs. Although evaluation was an important component of the general reform efforts of these districts, it is important to note that evaluation efforts generally did not assess resource allocation strategies. In particular, administrators infrequently mentioned the use of data and evaluation to examine how money and staff were allocated and none of the districts demonstrated the use of resource needs-assessment, cost-benefit analysis, or other analyses to plan budgets and measure the effectiveness of spending.

Research Question 4: Barriers and Challenges in the Improvement Districts

Analysis of survey and interview data regarding challenges and barriers showed that resource allocation in the improvement districts involved a trade-off process in which funds, time, staff, and other resources were divided among competing needs, often creating inequities. The analysis indicated that a number of allocation challenges were seen as resolvable, such as inflexibility of categorical funds or the need to build staff capacity. Other barriers and challenges, however, remained unresolved and negatively impacted the ability of districts to effectively allocate resources to support performance goals, such as within-district inequities; lack of time; and state requirements, especially those connected to the accountability system. Other barriers included industry-wide salary levels of teachers and unpredictable fund sources.

Within-district resource inequity was evidenced in many of the improvement districts. A common strategy for improvement districts was to identify areas of poor performance and prioritize resource allocation in order to improve those areas. Although this ensured that attention

focused on areas of greatest need, it also resulted in inequity in the distribution of resources. Low-priority subject areas and programs to enhance opportunities for middle- and high-performing students did not receive resources to the same level as programs for low-performing areas.

Time constraints, particularly for activities related to professional development, collaborative planning, time on task, new curriculum standards, and data collection and analysis, all required a time investment by improvement district administrators and teachers. Administrators were challenged to create needed time resources and often utilized the extra hours they and teachers were willing to volunteer to pursue reforms. Capacity-building during the school year was also a challenge for administrators. It meant that essential teaching skills and knowledge were being gained at the same time they had to be applied in the classroom. One district administrator likened the conflict to an airplane analogy saying that professional development is "like trying to build a plane while the thing's up in the air". Teachers indicated one of their uppermost barriers to improving student performance was limited planning time. While block scheduling created time for necessary grade level or subject area meetings, tutoring, curriculum development, and training, none of the 12 improvement districts were able to provide sufficient individual planning time for teachers.

State requirements, especially around new or modified accountability systems, created enormous challenges for most of the improvement districts, although they made necessary changes with relative success. Administrators explained that they were sometimes hesitant to fully implement state mandates since requirements often change and each change requires a new investment of resources. Some state and/or federal requirements were viewed by administrators as unsupported mandates, i.e., requiring the addition of programs or services, such as limiting

social promotion, increased benefits for employees, and data dis-aggregation, without sufficient funding or guidance on implementation. Late-arriving test results were another barrier that forced some districts to make poorly timed staffing and budget adjustments.

Recommendations

Major findings from this study indicate that states, districts, and schools must consider the allocation and application of fiscal and non-fiscal resources as an integral part of the education reform process. This will require that education policymakers ensure the implementation of a systemic and systematic approach to resource allocation directly tied to student improvement. This study identified a number of actions state policymakers can and should take to achieve this goal:

- Identify needs, priorities, and goals for all students by examining disaggregated student performance outcome data and other student data. Consider the environmental and contextual circumstances of schools, districts, and the state as a whole, as well as examine research-based information on effective reform strategies. Based on this data, identify a plan for improvement.
- Clearly communicate the needs, priorities, goals, and strategies in the improvement plan to all stakeholders, including district- and school-level staff, parents, and community members.
- Understand what resources are available, whether they be monetary, staff, physical, time, parent/community, or other resources. Allocate resources based on identified needs and priorities, not tradition.
- Investigate whether adequate funds are available to schools to support instructional goals. If shortages exist, district and state policymakers need to work together to determine how to

increase spending in priority areas and whether reallocation of existing resources is a viable option.

- Identify ways that existing resources might be used more efficiently, additional resources might be obtained, and fund sources might be pooled for greater effectiveness.
- Provide guidance to districts that supports staff through strategies such as building capacity in all staff, prioritizing resources with an emphasis on professional development, realigning staffing structures to accommodate the strengths and weaknesses of existing staff, and finding ways to recruit and retain quality staff through compensation and support systems.
- Support the collection of timely and detailed school-level fiscal and performance data and train local decision makers in the use of data for tracking spending and analyzing the effectiveness of spending. Data on resources should be tied directly to specific educational programs, staffing configurations, and other improvement strategies.
- Evaluate whether state resources are targeted to performance improvement practices. Conduct cost analysis or cost-benefit studies, evaluate the impact of programs and services, and monitor the equity of distribution of resources. Use the results to modify allocation strategies.
- Provide training and guidance to schools and districts, particularly those that are low-performing, to help them (1) use student performance and other data to identify needs and priorities, (2) examine research-based information to identify the strategies and practices that would best address their needs, (3) communicate the goals and strategies in their improvement plan to all stakeholders, and (4) evaluate the effectiveness of reform strategies and modify both strategies and resources that support them if needed.

- Communicate and share effective resource allocation practices by establishing formal and informal mechanisms for exchange within and across levels of education administration (federal, state, and local).

Conclusions and Areas for Future Research

This study showed that resource allocation and student outcomes are related, demonstrated that resource allocation strategies that align to school improvement activities help support student performance, and presented barriers and challenges that improvement districts face in allocating resources. Findings underscore the importance of prioritizing the allocation of monetary and non-monetary resources in school reform efforts. The study also raised the following questions:

- What is the relationship between overall resource allocation and allocation within certain categories or for certain practices? Do successful districts have more resources overall, spend more resources overall, or spend more resources only within specific categories and for specific practices?
- Given that resource allocation is a trade-off process, what alternatives are the most helpful for supporting student performance, e.g., investing resources in hiring more teachers versus hiring teachers with higher qualifications?
- How do changes in quantitative staffing and fiscal patterns relate to school improvement efforts and resource re-allocation evidenced by qualitative data?
- What roles do non-current expenditures (e.g., for capital outlay, equipment, technology, and facilities) and non-traditional and outside sources of funds play in supporting student performance?
- How are changes in resource allocation causally related to student performance improvements?

- How can state and district policy best support truly systemic and systematic resource allocation as well as address the resource allocation challenges faced by schools and districts?

References

Ballou, D. (1998). The condition of urban school finance: Efficient resource allocation in urban schools. In W. J. Fowler, Jr. (Ed.), *Selected papers in school finance, 1996* (pp. 61-84). Washington, DC: National Center for Education Statistics.

Coleman, J. S., Campbell, E. Q., Hobson, C. J., McPartland, J., Mood, A. M., Weinfeld, F. D., & York, R. L. (1966). *Equality of educational opportunity.* Washington, DC: U.S. Government Printing Office.

Ferguson, R. F. (1991). Paying for public education: New evidence on how and why money matters. *Harvard Journal on Legislation*, *28*, 465-497.

Greenwald, R., Hedges, L. V., & Laine, R. D. (1996). The effect of school resources on student achievement. *Review of Educational Research, 66*, 361-396.

Grissmer, D., Flanagan, A., & Williamson, S. (1998). Does money matter for minority and disadvantaged students? Assessing the new empirical evidence. In W. J. Fowler, Jr. (Ed.), *Developments in school finance, 1997* (pp. 15-30). Washington, DC: National Center for Education Statistics.

Hanushek, E. A. (1986). The economics of schooling: Production and efficiency in public schools. *Journal of Economic Literature, 24*, 1141-1177.

Hanushek, E. A. (1994). *Making schools work: Improving performance and controlling costs*. Washington, DC: The Brookings Institution.

Hanushek, E. A. (1997). Assessing the effects of school resources on student performance: An update. *Educational Evaluation and Policy Analysis*, *19*(2), 141-164.

Hedges, L. V., Laine, R. D., & Greenwald, R. (1994). Does money matter? A meta-analysis of studies of the effects of differential school inputs on student outcomes. *Educational Researcher, 23*(3), 5-14.

Krueger, A. B. (1998). Reassessing the view that American schools are broken. *Federal Reserve Bank of New York Economic Policy Review*, *4*(1), 29-43.

Miles, K. H., & Darling-Hammond, L. (1998). Rethinking the allocation of teaching resources: Some lessons from high-performing schools. *Educational Evaluation and Policy Analysis*, *20*, 9-29.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook.* Thousand Oaks, CA: Sage.

Murnane, R. J., & Levy, F. (1996). *Teaching the new basic skills*. New York, NY: The Free Press.

Odden, A. R., & Archibald, S. (2001). *Reallocating resources: How to boost student achievement without asking for more*. Thousand Oaks, CA: Corwin.

Odden, A. R., & Picus, L. O. (2000). *School finance: A policy perspective*. Boston, MA: McGraw Hill.

Picus, L. O. (2001). *In search of more productive schools: A guide to resource allocation in education*. Eugene, OR: ERIC Clearinghouse on Educational Management, University of Oregon.

Picus, L. O., & Fazal, M. B. (1995). The $300 billion question: How do public elementary and secondary schools spend their money? In W. J. Fowler, Jr. (Ed.). *Developments in school finance* (pp. 79-96). Washington, DC: National Center for Education Statistics.

Southwest Educational Development Laboratory. (SEDL, 2000). *Resource allocation practices and student achievement: An examination of district expenditures by performance level with interviews from twenty-one school districts*. Austin, TX: Author.

Stiefel, L., Berne, R., Iatarola, P., & Fruchter, N. (2000). High school size: Effects on budgets and performance in New York City. *Educational Evaluation and Policy Analysis*, *22*, 27-39.